Port of Inverness Maintenance Dredge

Capital Dredge Best Practicable Environmental Opinion Report

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Document Control

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1 Introduction

This Best Practicable Environmental Option (BPEO) report has been produced to support the dredge and disposal marine licence application under the Marine (Scotland) Act 2010 for the Port of Inverness maintenance dredging works, which are required to ensure safe access to their quays.

1.1 Report Aims and Objectives

The purpose of this report is to identify and assess the available options for the use and disposal of dredged materials from the maintenance dredging works at the Port of Inverness quaysides (South Citadel, North Longman and Longman Quays) along the River Ness, and in the approaches to the Port of Inverness. Pre-disposal sampling and sample analysis has been undertaken, the results of the analysis are outlined in this document. Further, the objectives of this document are to:

- Provide an overview of the required maintenance dredging works;
- Describe the proposed areas for which a maintenance dredge are required, including the estimated volume of material required to be dredged;
- Describe the BPEO methodology employed in the assessment; and
- Assess the BPEO for disposal of dredged material based on the sample analysis results.

2 Background

The Central and South Citadel Quays are utilised by the Port of Inverness, most notably as Inverness' primary bulk fuel delivery quay. If navigational access to these quays became restricted, there could be major implications for the Port of Inverness' operations, and the wider bulk fuel supply to Inverness.

The North Longman Quay, is the main quay supporting the energy and renewables industries. Over the last few years the port has handled turbine machinery for a number of projects including the Corrimony, Rothes II, Berryburn and Clashindarroch wind farms, as well as other equipment for the Moy, Dunmaglass, Corriegarth, Edintore, Hill of Glaschye and Bhlaraidh wind farms being passed through the port. The quay also has a heavy lift pad that can take lifts of up to 200 tonnes through a variety of engineering solutions.

In addition, the Longman Quay is the main operating quay at the Port of Inverness. With a total of 4 berths, the Longman Quay supports the import of salt, packaged timber and logs, as well as the export of woodchip, wood-pellets, logs and Sterling Board. The Sterling Board exports are a commercial connection of Norbord, whom actively use the Longman Quay at the Port of Inverness.

As well as providing commercial benefits, the Port's marina also provides benefits for local and recreational users.

As such, the aim of the proposed maintenance dredge works are to ensure continued safe navigational access to the Port of Inverness quaysides and marina. By ensuring safe navigational access, the Port of Inverness can continue to operate commercially and provide a facility for commercial and recreational users.

2.1 Dredge Areas and Volume

Four areas are required to be subject to a maintenance dredge and are as follows:

a) Sections of the River Ness Channel on the approaches to the Port of Inverness will be required to be dredged to a depth of -3.0m Chart Datum (CD) (see Drawing 2021-321C);
b) Areas along the Longman Quay which are above -5.5m CD will be required to be dredged to a depth which is deeper than 5.5m CD. The proposed dredge depth will be approximately ~ 0.75m (see Drawing 2021-322B);
c) Areas along the South Citadel Quay which are above -5.5m CD will be required to be dredged to a depth which is deeper than 5.5m CD. The proposed dredge depth will be approximately ~ 0.3m (see Drawing 2021-322B);
d) Areas along the North Longman Quay which are above -5.0m CD will be required to be dredged to a depth which is deeper than 5.0m CD. The proposed dredge depth will be approximately ~ 0.75m (see Drawing 2021-322B).

The proposed dredge areas combined, as shown in Drawing 2021-321C will comprise an area of approximately 10,039m^2.

2.2 Sampling

Sampling was conducted by Aspect Land & Hydrographic Surveys Ltd conforming to Marine Scotland Guidance notes on Pre-Disposal Sampling. The 'Surface Grab Sample & Sediment Analysis: Inverness Harbour, Highlands' Report is provided as Appendix 1.

The proposed dredge volume is less than 25,000m^3 and less than 10,000 tonnes over a three-year period. As such, in accordance with Table 1 of the Marine Scotland Guidance notes on Pre-Disposal Sampling (Marine Scotland, 2017), samples need to be taken from a minimum of 3 sample stations. In this instance four sampling points were proposed and agreed with Marine Scotland. As the proposed depth of the maintenance dredge is relatively shallow (<1m), grab samples were undertaken rather than borehole sampling.

Sampling Points 1 and 2, as shown in Drawing 2021-322B, were selected as they were within the North Longman and Longman Quays, and were therefore representative of the operational areas. As minimal dredging will be taking place at the South Citadel Quay, it was not deemed necessary for any sampling to be undertaken there. However, Sampling Point 2 is located at the edge of the Longman Quay, at the end close to South Citadel Quay and deemed to be representative of that area. Sampling Points 3 and 4, as shown on Drawing 2021-321C, have been selected as representative of the wider harbour area.

Table 2.1: Grab Sample Locations

Sample ID	Sample Area	Latitude (N)	Longitude (W)
MAR01120.001	North Longman Quay	57° 29.602052	004° 14.154908
MAR01120.002	Longman Quay	57° 29.356145	004° 13.995208
MAR01120.003	River Ness Channel	57° 29.829053	004° 14.123171
MAR01120.004	River Ness Channel	57° 29.375905	004° 14.146599

It should be noted that multiple attempts were made to recover material from Sampling Point 3 and on each occasion blue mussel shells were found within the sample. Using sterile gloves,

sediment was wiped from the surface of the shells and homogenised with the remaining material. During the samples being readied for laboratory analysis it was found that the quantity recovered at Sampling Point 3 was insufficient to achieve a full suite of analysis.

2.2.1 Sample Analysis

The required laboratory analysis was undertaken by SOCOTEC. Analysis was carried out in line with ISO17025 accreditation for marine sediment analysis and in line with other requirements stated within the Pre-disposal Sampling Guidance. All samples were tested for a suite of chemical parameters analysed against the Action Levels (AL) prescribed by Marine Scotland in their guidance (Marine Scotland, 2017).

The results of the grab sample analysis have been summarised in this section. The full sample results are available in the spreadsheet titled 'Port of Inverness Pre-Disposal Sampling Results' which have been supplied with the dredge licence application form.

2.2.1.1 Particle Size Distribution

The results of the grab sample analysis identified that particle size distribution (PSD) of the dredge material was comprised of 31.9% solids. Of these solids, on average 1.1% of the material was comprised of gravel, 17.4% was sand, and 81.5% was silt. These averages are derived from Sampling Points 1, 2 and 4 only, as sampling point 3 was found to be in an area containing blue mussel shells.

Geotechnical descriptions of the material from the grab samples are summarised in Table 2.2

Table 2.2: Grab Sample Geotechnical Descriptions

Sample ID / Sampling Point	Description
MAR01120.001 / Sampling Point 1	Sandy Mud
MAR01120.002 / Sampling Point 2	Gravelly Sandy Mud
MAR01120.003 / Sampling Point 3	Insufficient Material for Analysis
MAR01120.004 / Sampling Point 4	Sandy Mud

2.2.1.2 Trace Metals and Organotins

As shown in the 'Port of Inverness Pre-Disposal Sampling Results' spreadsheet, none of the grab samples analysed identified any exceedances of Action Level 1 (AL1) outlined in the Pre-Disposal Sampling guidance document for trace metals and organotins. The average for the total dredge area thus showed no exceedances of AL1. The potential dredge material is therefore not predicted to pose a threat to the environmental due to the presence of trace metals or organotins.

2.2.1.3 Polyaromatic Hydrocarbons (PAHs)

Across the range of Polyaromatic Hydrocarbons (PAH) tested at each of the sampling locations, there were 12 exceedances of AL1. Each exceedance can be seen in detail in the 'Port of Inverness Pre-Disposal Sampling Results' spreadsheet. However, when considering the average concentration of PAHs for the total dredge area (see PR-Details tab), there were no exceedances of AL1 detection limits. Therefore, the dredge material is not predicted to pose a threat to the environment due to the presence of PAHs.

3 BPEO Methodology

3.1 Best Practicable Environmental Option (BPEO)

In identifying the BPEO for the proposed maintenance dredge works, the following methodology has been employed:

- Identification of options available for the reuse/disposal of material. This considers the composition of the material removed and whether it was physically or chemically suitable for reuse;
- Screening to eliminate unsuitable options;
- Scoring of remaining options; and
- Comparison of options and identification of the BPEO.

3.1.1 Screening

Options for the reuse or disposal of the dredge material have been screened against a minimum criterion, in which each option had to meet to be taken forward for detailed consideration. The criteria used were:

- The proposed option must be technically viable based on the physical and chemical characteristics of the dredge material; and
- The proposed option must allow current operations ongoing at the Port of Inverness to carry on as scheduled.

3.1.2 Scoring

Feasible options were scored against a list of attributes; this approach ensures that the same considerations are given to each option so that they can be compared fairly. Attributes were identified to ensure that environmental, technical and cost considerations were taken account of in the decision-making process.

Attributes were scored out of 5 with 1 being the worst performing and 5 being the best, the definitions for each criterion were decided prior to the options being assessed. Each score has been designated a colour to aid visual comparison. The attributes and scoring definitions are provided in Appendix 2.

3.1.3 Comparison of Options and Identification of BPEO

Following the scoring of the options, detailed comparison of feasible options were undertaken to identify the BPEO.

4 Assessment of BPEO

4.1 Options Available

Several options were initially identified for the disposal of the proposed dredge material including both terrestrial and marine based options. A "do nothing" scenario is included for consideration in line with standard practice for BPEO assessments.

- Do Nothing;
- Re-use;

- Deposit at Sea to the Existing Inverness Disposal Site (CR027);
- Deposit at Sea to a New Disposal Site; and
- Plough Dredging.

4.2 Screening of Options

4.2.1 Do Nothing

To not undertake dredging would have a significant impact on the operations at the Port of Inverness. In order for vessels with large draughts to have continued access to both the marina and the quaysides at the port, maintenance dredge works are required to ensure safe navigation and access to the Port of Inverness' facilities. Hence, to do nothing would likely result in the Port of Inverness losing the ability to provide the current commercial and recreational offerings, and as such, this option is not feasible.

4.2.2 Re-use

The re-use of dredge material is near the top of the waste hierarchy and is therefore consistent with the Scottish Government's policy of a Zero Waste Scotland by 2025 (The Scottish Government, 2010). However, material for re-use must both be chemically and physically suitable for the planned reuse. The main reuse option for dredge material is as infill material for land reclamations. While the chemical characteristics of the material are suitable for re-use, this option has been discounted due to the material's physical characteristics.

As discussed in Section 2.1.1, the material has a very high silt content. Silt is not suitable for reuse in land reclamation as it doesn't have the appropriate weight bearing physical properties required, hence reuse options have not been considered further.

4.2.3 Deposit at Sea to a New Deposit Site

This option requires a new spoil deposit site to be consented near the Port of Inverness. However, this was screened out, as the legislative process is not only complex and lengthy, but there is already a suitable site for the disposal of dredge material used by the Port of Inverness nearby, the Inverness Disposal Site (CR027).

4.2.4 Plough Dredging

Plough dredging has not been considered further as it is not a technically feasible option. Large sections of the proposed dredge boundary are within a narrow channel within the River Ness, meaning that material would have to be ploughed along the whole channel, beyond the mouth of the River Ness and into the Beauly Firth. This method would move spoil into other areas of the River Ness channel and along the approaches to the Port of Inverness, with the possibility of making these areas less navigable due to material deposition decreasing depth.

In addition, this option also requires the movement of material from shallow to deeper depths, a characteristic that this location does not provide due to the relatively uniform depth within and immediately outwith the proposed dredge boundary. The composition of the riverbed also does not generally lend itself to efficient plough dredging being feasible.

4.3 Assessment of Feasible Options

Following the screening process, the only option taken forward for assessment was to 'Deposit at Sea to the Existing Inverness Disposal Site (CR027)'.

This option has been analysed against the attributes identified in Appendix 2. However, as deposition of material at the Inverness Deposit Site was identified as the only feasible option, there were no comparisons to be made between options.

4.3.1 Deposit at Sea to the Existing Inverness Deposit Site (CR027)

There are numerous open dredge and disposal sites located within Scottish Waters for deposition of dredged material. The closest site to the proposed dredge is the Inverness Disposal Site (CR027), located just outside the port. Deposit of dredge spoil to CR027 requires dredge material to be disposed of directly from marine plant.

The deposit of dredged spoil at sea to CR027 does not fully align with the Scottish Governments' policy of Zero Waste Scotland (Attribute Score 2: Alignment with Policy) as it is low on the waste hierarchy. As discussed in 2.1.3, the PSD analysis of the dredge material identified the material to be inappropriate for re-use due to high silt contents, and is therefore required to be disposed (Attribute Score 4: Technical Feasibility & Material Suitability).

The high silt content, however, may mean that the dredge spoil will remain suspended in the water column for some time post-disposal, and spreading of the dredge spoil through the water column is likely. The disposal site is within both the Moray Firth Special Area of Conservation (SAC) (designated for bottlenose dolphins) and the Moray Firth Special Protected Area (SPA) (designated for ornithological features). Although falling material has the potential to increase sedimentation in the water column, which could impact on the foraging success of the receptors, the waters within the disposal site are already high in silt content. Turbidity can increase due to natural fluctuations in the water environment, and as such, sedimentation increases due to the disposal of dredge material should not impair the foraging success of receptors further. The potential impacts of sediment suspension associated with falling material during disposal may also impact on other receptors such as Atlantic salmon. To reduce impacts on Atlantic salmon, dredging and disposal will only be carried out between the months of July – September, to avoid the smolt/salmon runs (Attribute Score 3: Environmental Effects). The potential impacts are discussed in Section 6 of the Environmental Supporting Document (Affric Limited, 2022a).

All dredge spoil will be removed by floating marine-based plant, and as such, there will little additional costs associated with transferring the dredge spoil onto other marine plant and disposing it to CR027 (Attribute Score 5: Cost).

Maintenance dredge operations will also be undertaken over a period of 3 years. As dredging is able to take place over a period of 3 years, it is not anticipated that maintenance dredge works will be required to be extended in order to ensure safe navigation into the Port of Inverness area (Attribute 5: Timescale). In addition, the CR027 Disposal Site is within 1 mile of the site, limiting the amount of travel required to reach the site (Attribute Score 5: Distance).

Disposal to the designated site will be permitted in terms of the dredge licence for the Port of Inverness proposed maintenance dredge works and no further licence or permits will be

required. There will, however, be some management required to ensure the deposit complies with the conditions of the licence (Attribute Score 4: Legislative Complexity).

Dredge activity will require to be performed in the River Ness channel and the navigational approaches to the mouth of the River Ness, which may increase interactions with other vessel users and navigational issues may arise. However, this will have minimal impact on current operations within the harbour to access CR027 within the Beauly Firth (Attribute Score 3: Impacts on Port Operations).

5 Conclusions

The pre-disposal sample results have informed this assessment in terms of providing an understanding of both the chemical and physical status of the sediments to be dredged. Multiple options for material management were considered. However, most options were screened out. The the material is unsuitable for re-use, plough dredging would not be possible in this location, and to do nothing would impact upon safe navigation and the operations of the port. Deposition of material at a new site was not considered as a feasible option due to the consenting times line.

There is already an open disposal site close to the location of the maintenance works and this was the only option considered in the assessment as being feasible. Hence, the BPEO is 'Deposit at Sea to the Existing Inverness Disposal Site (CR027)', noting that appropriate mitigation will be required to minimise effects on ecological receptors. The need for, and identification of, mitigation is discussed in the Environmental Supporting Document (Affric, 2022a), this is supported by a Habitat Regulations Appraisal (HRA) (Affric Limited, 2022b).

6 References

Affric Limited. (2022a). Port of Inverness – Maintenance Dredge Works. Environmental Supporting Document. Document Number 80/REP/T03-01.

Affric Limited. (2022b). Habitat Regulations Appraisal Pre-Screening Report: *Port of Inverness – Maintenance Dredge Works*. Document Number 80/REP/T03-02.

Marine Scotland. (2017). Pre-disposal sampling Guidance. Version 2.

The Scottish Government. (2010). Scotland's Zero Waste Plan.

7 Glossary

Acronym	Definition
AL	Action Levels
BPEO	Best Practicable Environmental Option
CD	Chart Datum
HRA	Habitat Regulations Appraisal
m	Metres
m^3	Metres-cubed
PAH	Polyaromatic Hydrocarbons
PSD	Particle Size Distribution
SAC	Special Area of Conservation
SPA	Special Protected Area

Appendix 1: Surface Grab Sample & Sediment Analysis: Inverness Harbour, Highlands

Aspect
Land+Hydrographic Surveys
CHARTERED SURVEYORS

TEL: 01294 313 399 • WEB: WWW.ASPECTSURVEYS.COM

SURFACE GRAB SAMPLE & SEDIMENT ANALYSIS

INVERNESS HARBOUR, HIGHLANDS

AUGUST 2021

PROJECT REF: A7833

REV: 00

Client:

Wallace Stone LLP
Royal Bank Buildings
High Street
Dingwall
Inverness-shire
IV15 9HA

WALLACE STONE

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DATE	REVISON	COMPILED	CHECKED	NOTES
23/09/2021	00	GWT	RM	FOR CLIENT REVIEW

1. PROJECT SUMMARY

On the instructions of Wallace Stone LLP, Aspect Land & Hydrographic Surveys Ltd (herein ALHS) were commissioned to conduct sediment sampling at No. 4 locations within the River Ness, Inverness to support a dredge license application on behalf of Inverness Harbour Trust. The work was conducted on 24th August 2021.

The program of events was as follows:

DATE	ACTIVITY
23/08/2021	Mobilise equipment to site.
24/08/2021	Sediment sampling conducted.
24/08/2021	Demobilise equipment.
25/08/2021	Samples sub-sampled and frozen.
26/08/2021	Samples sent to SOCOTEC for analysis.
22/09/2021	Sample analysis report received from SOCOTEC.
23/09/2021	Report issued to Client.

2. SCOPE OF WORKS

A total of four sampling locations were identified by the client within Inverness Harbour and the approach channel, as highlighted in Figure 1.

Due the anticipated dredge depths being less than 1m, Marine Scotland guidelines require only surface grab samples to be recovered, using a Van Veen type grab or similar.

On retrieval of material, all samples were to be analysed in line with Marine Scotland AL2 requirements.

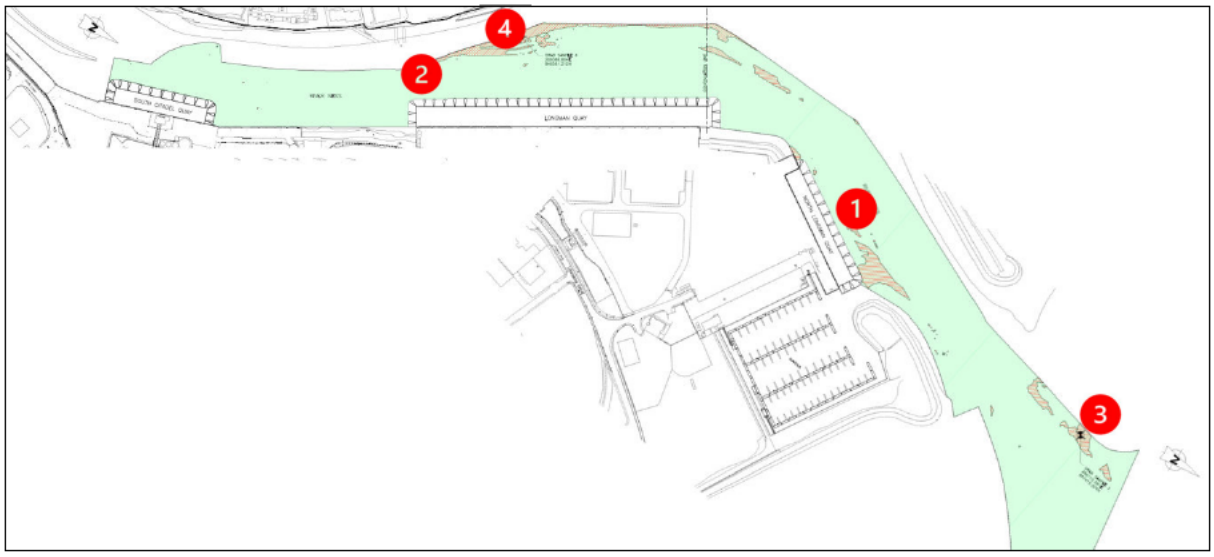

FIGURE 1 - OVERVIEW OF SEDIMENT SAMPLING LOCATIONS: INVERNESS HARBOUR, HIGHLANDS

3. GEODESY & DATUM

The horizontal datum used throughout the data gathering phase of the survey was OSGB36 (OSTN15). Data has been rendered in OSGB36 Datum, British National Grid.

The vertical datum for all data issued is Chart Datum. OSTN15 defines OSGB36 National Grid in conjunction with the National GPS Network. In this respect OSTN15 can be considered error free (not including any GPS positional errors). The agreement between OSTN15 and the old triangulation network stations (down to 3rd order) is 0.1m rms.

The vertical datum used for all survey data is Chart Datum (CD). Chart Datum is 2.25m below Ordnance Datum at Inverness.

4. PERMITS & NOTICE OF EXEMPTION

Prior to commencement of sampling works, a Notice of Exempt Activity was provided to Marine Scotland, with supporting correspondence received from Northern Lighthouse Board [NLB], the Maritime Coast Agency [MCA] and the Statutory Harbour Authority [SHA] to confirm the sampling activities did not pose a hazard to navigation.

Given the proximity of grab sample 3 to the Moray Firth SAC [Special Area of Conservation] NatureScot were contacted to request agreement that the works would not pose an environmental hazard to local marine wildlife.

All required permits were granted and effective to enable the sampling work to be completed on 24th August 2021.

5. SEDIMENT SAMPLING METHODOLOGY

At each location, a Van Veen grab was used to collect a sample of sediment for future analysis. The grab is designed for collecting sediment samples in fresh and marine water, from soft or medium-hard materials such as sand, gravel, consolidated marl, or clay.

It consists of two buckets connected by a hinge, and during descent the two buckets remain apart. When it hits the bottom, the locking mechanism releases, and when the main line is pulled to retrieve the grab, the buckets close allowing the collection of the sample. Within the design is a locking mechanism that is released on contact with the bottom, allowing the grab to close.

The unit is constructed from AISI 316 stainless steel and is weighted by additional lead weights to help the grab enter the sediment. Each bucket has an upper window that allow inspection of the sample or removal of a sub-sample.

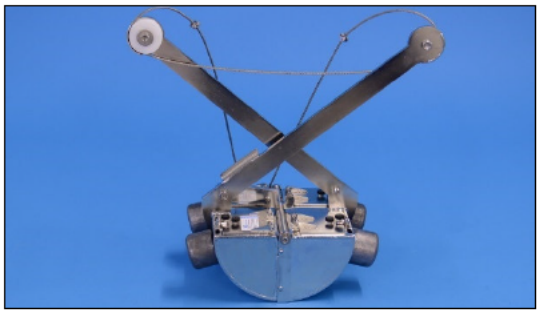

FIGURE 2 - VAN VEEN GRAB SAMPLER

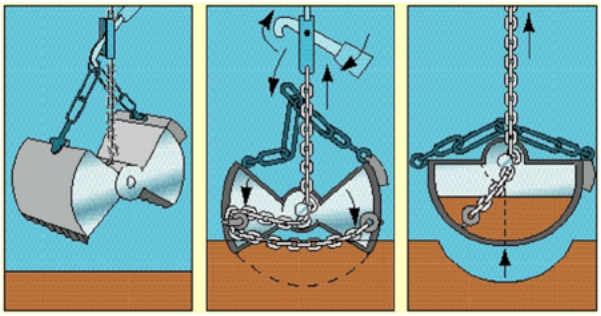

FIGURE 3 - SAMPLER MECHANISM OVERVIEW

SAMPLE ID	EASTING	NORTHING
GRAB SAMPLE 1	266084.839	847001.841
GRAB SAMPLE 2	266229.336	846540.468
GRAB SAMPLE 3	266130.400	847421.850
GRAB SAMPLE 4	266079.325	846582.097

SAMPLE NUMBER	SEABED LEVEL	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GRAB SAMPLE 1	-7.51m (OD)	COARSE SILT	SANDY MUD

NOTES: N/A

SAMPLE NUMBER	SEABED LEVEL	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GRAB SAMPLE 2	-8.04m (OD)	COARSE SILT	GRAVELLY SANDY MUD

NOTES: N/A

SAMPLE NUMBER	SEABED LEVEL	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GRAB SAMPLE 3	-6.05m(OD)	-	-

NOTES: Multiple sample recovery attempts due to location of mussel bed at stipulated position. Sediment scraped from shells etc. and homoginised before sub-sampling. Insufficient sediment recovered for full analysis suite to be completed.

During the sample collection phase, grab sample 3 was found to be in an area containing mussel shells.

Multiple attempts were made to recover material and on each occasion mussel shells were found within the sample. Using sterile gloves, sediment was wiped from the surface of the shells and homogenised with the remaining material.

During the samples being readied for laboratory analysis it was found that the quantity recovered at location 3 was insufficient to achieve a full suite of analysis.

In consultation with the client, it was agreed that the material at location 3 would be tested for Metals & TOC, as this would likely to give numbers of use to demonstrate any level of contamination, and Moisture, Organotins, PAH, THC as this would relate to any fuel activity related to contamination.

SAMPLE NUMBER	SEABED LEVEL	FOLK & WARD DESCRIPTION	TEXTURAL GROUP CLASSIFICATION
GRAB SAMPLE 4	-5.49m(OD)	COARSE SILT	SANDY MUD
			
NOTES: N/A			

6. MARINE SCOTLAND ANALYSIS STANDARDS

The required laboratory analysis was undertaken by SOCOTEC, from their facilities in Burton on Trent.

SOCOTEC UK Ltd has UKAS accreditation for marine sediment analysis and their detection limits for these tests are below the Marine Scotland Action Level assessment criteria.

Their detection limits also meet the requirements set out in the CSEMP Green Book and have participated in QUASIMEME, an inter-laboratory proficiency scheme for the testing of marine sediments, for 15 years.

A full photographic and written record of each sample was taken and thereafter placed in an air-tight container, labelled, and delivered to the laboratory for testing and analysis.

An overview of the sediment analysis tests required to comply with the client's requirements are shown in Figure 4 & Figure 5.

Given the proposed method of disposal, there is no requirement for additional WAC testing (Waste Acceptance Criteria) which is in addition to the standard Marine Scotland analysis.

Matrix	Determinand	LoD	Method / Instrument	Turnaround (working days)	Quality Management System	SOP
Sediment	**CRM / In-House Reference Material to be run with each batch and data included in report**					
	Moisture content	0.2%	Oven drying @ 120°C	15	UKAS 17025	ASC/SOP/303
	Total Organic Carbon (TOC)	0.02%	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR	15	UKAS 17025	SOCOTEC Environmental Chemistry*
	Particle Size Analysis	%	Distribution by wet & dry sieving and laser diffraction	15	NMBAQC	SUB
	Density	N/A	Density	15	Not Accredited	SOCOTEC Doncaster*
	Metals Suite, Sieving <63µm, inc. low level Hg at 0.01mg/kg (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn)	0.01 - 2mg/kg	Aqua-regia extraction & ICP-MS	15	UKAS 17025	SOCOTEC Environmental Chemistry*
	Organotins (DBT, TBT)	1µg/kg	Acid digest and solvent extraction GC-MS	15	UKAS 17025	ASC/SOP/301
	PAHs (DTI 2-6 ring aromatics + EPA 16) **For full list of compounds see table over page**	1µg/kg	Solvent extraction & GC-MS	15	UKAS 17025	ASC/SOP/304
	PAHs (EPA 16 only) **For full list of compounds see table over page**	1µg/kg	Solvent extraction & GC-MS	15	UKAS 17025	ASC/SOP/304
	PCBs (ICES 7) **For full list of compounds see table over page**	0.08µg/kg	Solvent extraction & GC Triple Quad	15	UKAS 17025	ASC/SOP/302
	PCBs (25 congeners inc. ICES 7) **For full list of compounds see table over page**	0.08µg/kg	Solvent extraction & GC Triple Quad	15	UKAS 17025	ASC/SOP/302
	Total Hydrocarbon Content	100µg/kg	Solvent extraction & GC-FID	15	Not Accredited	ASC/SOP/306
	Organochlorine Pesticides **For full list of compounds see table over page**	0.1µg/kg	Solvent extraction & GC Triple Quad	15	UKAS 17025	ASC/SOP/302
	Asbestos Identification	N/A	Presence or absence	15	UKAS 17025	SOCOTEC Asbestos*
	PBDEs	0.1µg/kg	SUB	15	Not Accredited	SUB

FIGURE 4 - MARINE SCOTLAND SEDIMENT ANALYSIS SUITE

PAHs (~Indicates included in DTI 2-6 ring)			
Acenaphthene	Benzo(e)pyrene	C3-naphthalenes~	Naphthalene
Acenaphthylene	Benzo(ghi)perylene	Chrysene	Perylene
Anthracene	Benzo(K)fluoranthene	Dibenzo(ah)anthracene	Phenanthrene
Benzo(a)anthracene	C1-naphthalenes~	Fluoranthene	Pyrene
Benzo(a)pyrene	C1-phenanthrene~	Fluorene	
Benzo(b)fluoranthene	C2-naphthalenes~	Indeno(1,2,3-cd)pyrene	

PCBs (ICES7)			
PCB28	PCB52	PCB101	PCB118
PCB138	PCB153	PCB180	

Organochlorine Pesticides	
alpha-Hexachlorcyclohexane	Hexachlorobenzene
beta-Hexachlorcyclohexane	p,p'-Dichorodiphenyldicloroethylene
gamma-Hexachlorcyclohexane	p,p'-Dichorodiphenyltrichloroethane
Dieldrin	p,p'-Dichorodiphenyldicloroethane

FIGURE 5 - MARINE SCOTLAND SEDIMENT ANALYSIS SUITE

7. DELIVERABLES REGISTER

A list of the rendered deliverables is provided in the table below:

FILE NAME	CONTENTS
A7833_Inverness Harbour, Highlands.pdf	Report of Survey
MAR01120.xls	Certificates of Analysis
OEL_SOC3190921_PSD_V01_ Data Submission - MAR01120.xls	Particle Size Distribution Analysis
Marine Scotland - Results Template MAR01120.xlsx	Pre-Disposal Sampling Results Form

8. SURVEY PERSONNEL

The following personnel were involved in the project:

NAME	POSITION
G. Thomson	Client Liaison, Permit & Sample Analysis Coordination
A. Julyan	Sample Gathering and Sub-Sampling
R. Maider	QA / QC Review & Report Release
S. Norman	HSE Coordinator

9. QUALITY ASSURANCE STATEMENT

ALHS is an ISO PAS 99 accredited company offering a full range of topographic, hydrographic, geophysical, oceanographic, and marine environmental survey services, with expertise in combining multiple disciplines into single projects.

ALHS produce work to the highest quality, certified by our accreditation to numerous organisations including the Royal Institute of Chartered Surveyors, the Institute of Civil Engineering Surveyors and The Scottish Hydrographic Society.

Our administrative procedures are fully audited to ISO9001:2015 standard and vigorously maintained via stringent quality control procedures. We are also accredited to Achilles via UVDB Category B1.

These standards are audited annually by external consultants to ensure continued, on-going compliance and copies of these certificates can be submitted if required.

10. STANDARD DISCLAIMER STATEMENT

> All client-supplied data is taken on trust as being accurate and correct, and the sub-contractor cannot be held responsible for the quality and accuracy of that data set.

> The limits of this survey are defined by the data set; out with the survey limits are not covered at any level by the sub-contractor.

> The data is accurate at the time of data acquisition, the sub-contractor cannot be held responsible for environmental changes, and the client by accepting this report accepts that the geological environment is subject to continuous change, that items of debris, hard contacts etc. may move, appear, be relocated or removed, thickness of surficial sediment change out with the knowledge of the sub-contractor, and they will not be held responsible for such actions at any level.

> No liability of any kind is accepted by Aspect Land & Hydrographic Surveys Ltd for any error or omission within third party analysis information.

ANNEX A
CERTIFICATES OF ANALYSIS

A7833

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	**MAR01120**	
Issue Version	1	
Customer	Aspect Land & Hydrographic Surveys Ltd, Thornhouse Business Centre, Ballot Road, Irvine, Ayrshire, KA12 0HW	
Customer Reference	Inverness Harbour Marine Scotland Analysis	
Date Sampled	24-Aug-21	
Date Received	01-Sep-21	
Date Reported	23-Sep-21	
Condition of samples	Cold	Satisfactory

Redacted

Authorised by: Marya Hubbard

Position: Laboratory Manager

Any additional opinions or interpretations found in this report, are outside the scope of UKAS accreditation.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	%	%	%	%	%	Mg/m3
		Method No	ASC/SOP/303	ASC/SOP/303	SUB_01*	SUB_01*	SUB_01*	SOCOTEC Doncaster*
		Limit of Detection	0.2	0.2	N/A	N/A	N/A	N/A
		Accreditation	UKAS	UKAS	N	N	N	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Total Moisture @ 120°C**	**Total Solids**	**Gravel (>2mm)**	**Sand (63-2000 µm)**	**Silt (<63 µm)**	**Particle Density**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	71.7	28.3	0.0	16.4	83.6	2.56
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	66.1	33.9	3.3	21.3	75.4	2.55
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	48.4	51.6	I.S	I.S	I.S	I.S
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	66.5	33.5	0.0	14.6	85.4	2.57
		Reference Material (% Recovery)	N/A	N/A	N/A	N/A	N/A	N/A
		QC Blank	N/A	N/A	N/A	N/A	N/A	N/A

* See Report Notes
NAIIS - No Asbestos Identified In Sample
I.S Insufficient

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	N/A	% M/M
		Method No	SUB_02*	SOCOTEC Env Chem*
		Limit of Detection	N/A	0.02
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Asbestos**	**TOC**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	NAIIS	0.93
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	NAIIS	2.73
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	I S	1.13
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	NAIIS	2.98
		Reference Material (% Recovery)	N/A	97
		QC Blank	N/A	<0.02

* See Report Notes
NAIIS - No Asbestos Identified In Sample
I.S Insufficient

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	mg/Kg (Dry Weight)							
		Method No	SOCOTEC Env Chem*							
		Limit of Detection	0.5	0.04	0.5	0.5	0.01	0.5	0.5	2
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Mercury**	**Nickel**	**Lead**	**Zinc**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	15.5	0.23	30.4	15.0	0.08	18.9	21.6	96.8
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	8.9	0.15	25.6	15.1	0.05	16.3	17.3	72.4
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	4.3	0.08	12.6	8.5	0.03	8.7	7.3	40.0
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	12	0.19	28.9	15.7	0.09	18.0	20.6	77.7
Certified Reference Material SETOC 774 (% Recovery)			108	107	94	103	97	104	100	105
QC Blank			<0.5	<0.04	<0.5	<0.5	<0.01	<0.5	<0.5	<2

* See Report Notes

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	
		Method No	ASC/SOP/301	
		Limit of Detection	1	1
		Accreditation	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**Dibutyltin (DBT)**	**Tributyltin (TBT)**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	70.2	<5
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	<5	<5
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	20.2	14.2
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	37.1	21.2
Certified Reference Material BCR-646 (% Recovery)			111	100
QC Blank			<1	<1

* See Report Notes

Certificate of Analysis

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Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**ACENAPTH**	**ACENAPHY**	**ANTHRACN**	**BAA**	**BAP**	**BBF**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	3.96	6.15	9.47	34.4	50.4	66 2
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	5.60	4.57	11.1	41.0	49.3	66 3
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	6.69	6.49	19.5	65.3	71.5	62.0
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	5.96	8.80	17.4	55.7	63.2	82.1
Certified Reference Material Quasimeme QPH103MS (% Recovery)			111	105	98	83	97	86
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries

~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.

As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

Certificate of Analysis

Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID MAR01120
Issue Version 1
Customer Reference Inverness Harbour Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304
		Limit of Detection	1	1	1	1	1	1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**BENZGHIP**	**BKF**	**CHRYSENE**	**DBENZAH**	**FLUORANT**	**FLUORENE**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	60.0	34.3	40.6	10.0	60.8	5.55
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	54.9	35.8	45.8	10.3	78.4	7.69
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	55.3	50.0	60.7	10.7	103	8.49
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	65.9	41.0	62.7	12.3	151	10 9
Certified Reference Material Quasimeme QPH103MS (% Recovery)			108	102	96	100	84	109
QC Blank			<1	<1	<1	<1	<1	<1

For full analyte name see method summaries
~ Indicates result is for an In-house Reference Material as no Certified Reference Materials are avaliable.
As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

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Issuing Laboratory SOCOTEC, Marine Department, Specialist Chemistry, Etwall House, Bretby Business Park, Ashby Road, Bretby, Burton-upon-Trent DE15 0YZ

Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/304	ASC/SOP/303/306
		Limit of Detection	1	1	1	1	100
		Accreditation	UKAS	UKAS	UKAS	UKAS	N
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**INDPYR**	**NAPTH**	**PHENANT**	**PYRENE**	**THC**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	62.6	16.7	32.3	67.0	161000
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	61.7	14.0	28.9	85.4	130000
Grab Sample 3: Inverness Harbour, Highlands [A7833]	MAR01120.003	Sediment	58.2	207	42.8	111	69000
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	73.6	11.4	57.9	148	169000
Certified Reference Material Quasimeme QPH103MS (% Recovery)			99	99	102	92	90~
QC Blank			<1	<1	<1	<1	<100

For full analyte name see method summaries

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As the method uses surrogate standards to correct for losses, the RM results are reported as percentage trueness, not recovery.

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Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.08	0.08	0.08	0.08	0.08	0.08	0.08
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB138**	**PCB153**	**PCB180**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	1.02	0.89	0.31	0.17	0.23	0 26	0.09
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	0.95	0.81	0.32	0.20	0.35	0 25	0.15
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	1.48	1.32	0.51	0.30	0.54	0.47	0.21
Certified Reference Material Quasimeme QOR134MS (% Recovery)			101	108	113	117	98	97	89
QC Blank			<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08

For full analyte name see method summaries

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* See Report Notes

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Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

		Units	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)	µg/Kg (Dry Weight)
		Method No	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302	ASC/SOP/302
		Limit of Detection	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		Accreditation	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS	UKAS
Client Reference:	**SOCOTEC Ref:**	**Matrix**	**AHCH**	**BHCH**	**GHCH**	**DIELDRIN**	**HCB**	**DDE**	**DDT**	**DDD**
Grab Sample 1: Inverness Harbour, Highlands [A7833]	MAR01120.001	Sediment	<0.1	<0.1	0.11	0.24	0.13	0 24	<0.1	0.19
Grab Sample 2: Inverness Harbour, Highlands [A7833]	MAR01120.002	Sediment	<0.1	<0.1	<0.1	0.57	0.12	0 23	<0.1	0.29
Grab Sample 4: Inverness Harbour, Highlands [A7833]	MAR01120.004	Sediment	<0.1	<0.1	0.12	0.61	0.17	0.44	0.20	0.31
Certified Reference Material Quasimeme QOR134MS (% Recovery)			87~	88~	91~	87~	89	77	74	75
QC Blank			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

For full analyte name see method summaries

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Test Report ID MAR01120
Issue Version 1
Customer Reference Inverness Harbour Marine Scotland Analysis

REPORT NOTES

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
SOCOTEC Env Chem*	MAR01120.001-004	Analysis was conducted by an internal SOCOTEC laboratory. UKAS accredited analysis by this laboratory is under UKAS number 1252.
SOCOTEC Doncaster*	MAR01120.001, 002, 004	Analysis was conducted by an internal SOCOTEC laboratory.
SUB_01*	MAR01120.001, 002, 004	Analysis was conducted by an approved subcontracted laboratory.
SUB_02*	MAR01120.001, 002, 004	Analysis was conducted by an approved subcontracted laboratory.
ASC/SOP/301	MAR01120.001-002	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.
ASC/SOP/303/304	MAR01120.001-004	Chrysene is known to coelute with Triphenylene and these peaks can not be resolved. t is believed Triphenylene is present in these samples therefore it is suggested that the Chrysene results should be taken as a Chrysene (inc. Triphenylene).This should be taken into consideration when utilising the data.

DEVIATING SAMPLE STATEMENT

Deviation Code	Deviation Definition	Sample ID	Deviation Details. The following information should be taken into consideration when using the data contained within this report
D1	Holding Time Exceeded	N/A	N/A
D2	Handling Time Exceeded	N/A	N/A
D3	Sample Contaminated through Damaged Packaging	N/A	N/A
D4	Sample Contaminated through Sampling	N/A	N/A
D5	Inappropriate Container/Packaging	N/A	N/A
D6	Damaged in Transit	N/A	N/A
D7	Insufficient Quantity of Sample	N/A	N/A
D8	Inappropriate Headspace	N/A	N/A
D9	Retained at Incorrect Temperature	N/A	N/A
D10	Lack of Date & Time of Sampling	N/A	N/A
D11	Insufficient Sample Details	N/A	N/A
D12	Sample integrity compromised or not suitable for analysis	N/A	N/A

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Test Report ID	MAR01120
Issue Version	1
Customer Reference	Inverness Harbour Marine Scotland Analysis

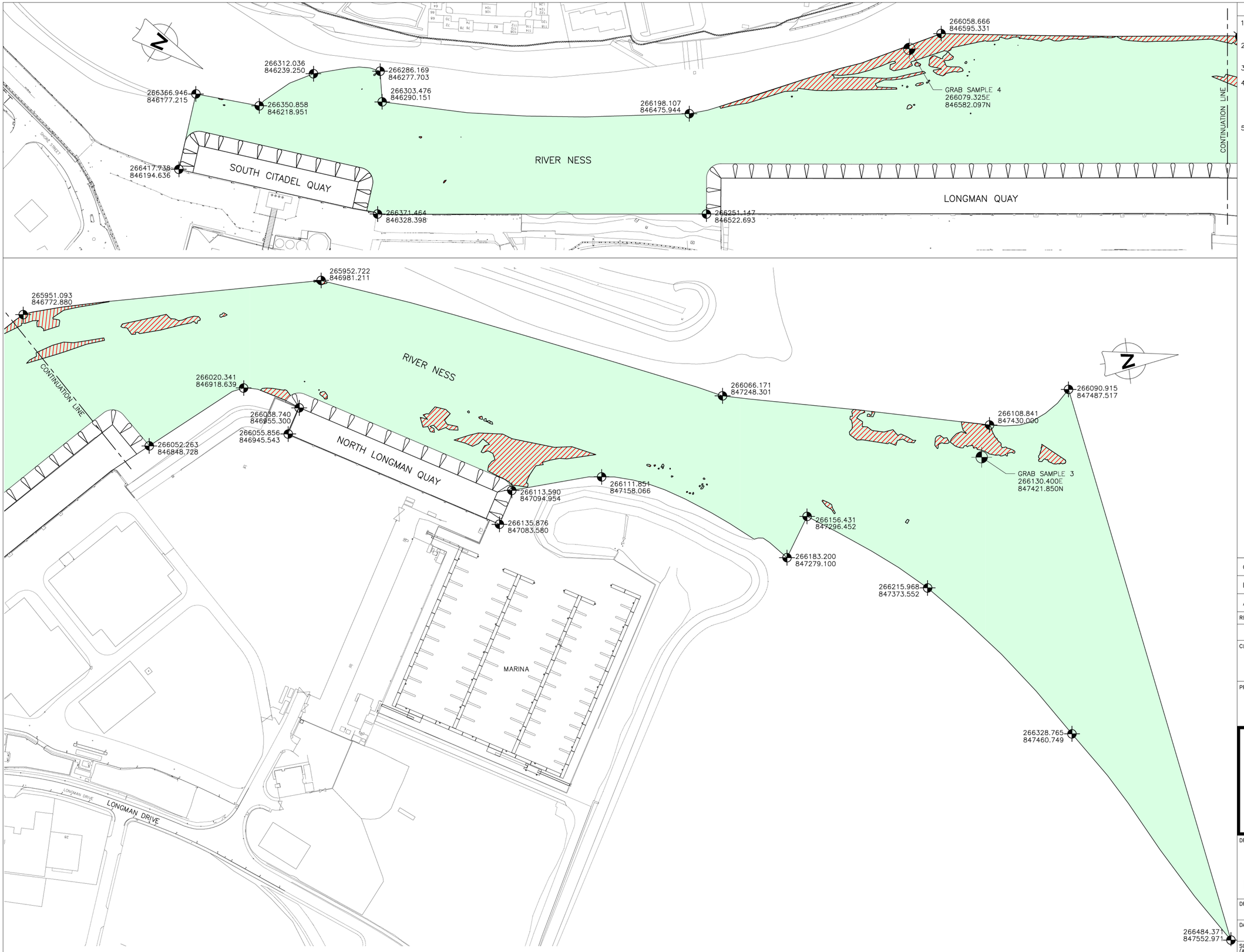
Method	Sample and Fraction Size	Method Summary
Total Solids	Wet Sediment	Calculation (100%-Moisture Content).Moisture content determined by drying a portion of the sample at 120°C to constant weight.
Particle Size Analysis	Wet Sediment	Wet and dry sieving followed by laser diffraction analysis.
Total Organic Carbon (TOC)	Air dried and ground	Carbonate removal and sulphurous acid/combustion at 1600°C/NDIR.
Metals	Air dried and seived to <63µm	Aqua-regia extraction followed by ICP analysis.
Organotins	Wet Sediment	Solvent extraction and derivatisation followed by GC-MS analysis.
Polyaromatic Hydrocarbons (PAH)	Wet Sediment	Solvent extraction and clean up followed by GC-MS analysis.
Total Hydrocarbon Content (THC)	Wet Sediment	Solvent extraction and clean up followed by GC-FID analysis.
Polychlorinated Biphenyls (PCBs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.
Organochlorine Pesticides (OCPs)	Air dried and seived to <2mm	Solvent extraction and clean up followed by GC-MS-MS analysis.

Analyte Definitions					
Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name	Analyte Abbreviation	Full Analyte name
ACENAPTH	Acenaphthene	C2N	C2-naphthalenes	THC	Total Hydrocarbon Content
ACENAPHY	Acenaphthylene	C3N	C3-naphthalenes	AHCH	alpha-Hexachlorcyclohexane
ANTHRACN	Anthracene	CHRYSENE	Chrysene	BHCH	beta-Hexachlorcyclohexane
BAA	Benzo[a]anthracene	DBENZAH	Dibenzo[ah]anthracene	GHCH	gamma-Hexachlorcyclohexane
BAP	Benzo[a]pyrene	FLUORANT	Fluoranthene	DIELDRIN	Dieldrin
BBF	Benzo[b]fluoranthene	FLUORENE	Fluorene	HCB	Hexachlorobenzene
BEP	Benzo[e]pyrene	INDPYR	Indeno[1,2,3-cd]pyrene	DDD	p,p'-Dichorodiphenyldichloroethane
BENZGHIP	Benzo[ghi]perylene	NAPTH	Naphthalene	DDE	p,p'-Dichorodiphenyldicloroethylene
BKF	Benzo[k]fluoranthene	PERYLENE	Perylene	DDT	p,p'-Dichorodiphenyltrichloroethane
C1N	C1-naphthalenes	PHENANT	Phenanthrene		
C1PHEN	C1-phenanthrene	PYRENE	Pyrene		

Appendix 2: Scoring Attributes

Attribute	Description	1	2	3	4	5
Alignment with Policy	How complex are the regulator requirements and what risks are posed.	In direct conflict with policy.	Does not fully align with policy.	No policy implications.	In the spirit of policy.	Positively implements policy.
Cost	Financial Cost of the Option	>£ 500 000	£300 000 to £500 000	£150,000 to £300,000	£50,000 to £150,000	<£50,000
Timescale	Impact of works on project programme.	Dredge would extend the project programme.	High risk dredge couldn't be completed within required timescale.	Slight risk dredge couldn't be completed within required timescale.	Allows dredge to be completed within required timescale.	Allows dredge to be completed comfortably within required timescale.
Material Suitability	Is the chemical makeup and PSD of material suitable for the option selected?	Not all of the material is acceptable.	Requires significant mitigation to be made suitable.	Acceptable with mitigation.	Acceptable material for option.	Ideal material for option.
Distance	Impact location has on logistics for material movements.	Beyond 50 miles	40-50 miles	30-40 miles	1-30 miles	Within 1 Mile
Technical Feasibility	Is the option within the capabilities of the Port of Inverness to carry out?	Technology not proven.	Complex requirements, but proven technology.	Simple proven technology available.	Practicable with basic management.	Standard practice
Environmental Effects	Potential environmental effects associated with implementing the option.	Very Significant	Significant	Minimal	Trivial	None
Impacts on Harbour Operations	Level of interference with normal port operations.	Very Significant	Significant	Minimal	Trivial	None
Legislative Complexity	How complex are the regulator requirements and what risks are posed.	Significant risk additional permits, licences or consents will not be granted.	Requires significant additional permits, licences or consents.	Requires additional permits, licences or consents.	Minor management required to comply with legislation	Complies with all relevant legislation.

Drawings



RIVER NESS CHANNEL DREDGE

SCALE 1:1250

PROPOSED DREDGE DEPTH < 1.0m
VOLUME OF DREDGE = 2566m³
AREA OF DREDGE = 6223m²

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM UNLESS NOTED OTHERWISE.
3. CHART DATUM IS 2.25m BELOW ORDNANCE DATUM.
4. TIDE LEVELS:

HAT 5.3m	MLWN 1.7m
MHWS 4.6m	MLWS 0.8m
MHWN 3.5m	LAT −0.1m

5. FOR SOUTH CITADEL QUAY, LONGMAN QUAY AND NORTH LONGMAN QUAY DREDGE POCKETS REFER TO DRAWING 2021−322

LEGEND

DEPOSITS ABOVE −3.0m CD

RIVER DREDGE CHANNEL −3.0m CD OR BELOW

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D
C	10.01.22	SETTING OUT POINTS ADDED	PM	TR	TR
B	07.01.22	AREA OF DREDGE ADDED	PM	TR	TR
A	06.10.21	COORDINATES OF 'AS DUG' GRAB SAMPLES ADDED	ADS	TR	TR

AMENDMENTS

CLIENT

PORT OF INVERNESS

PROJECT

HARBOUR ENGINEER

Wallace Stone
CONSULTING CIVIL ENGINEERS
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DRAWING TITLE

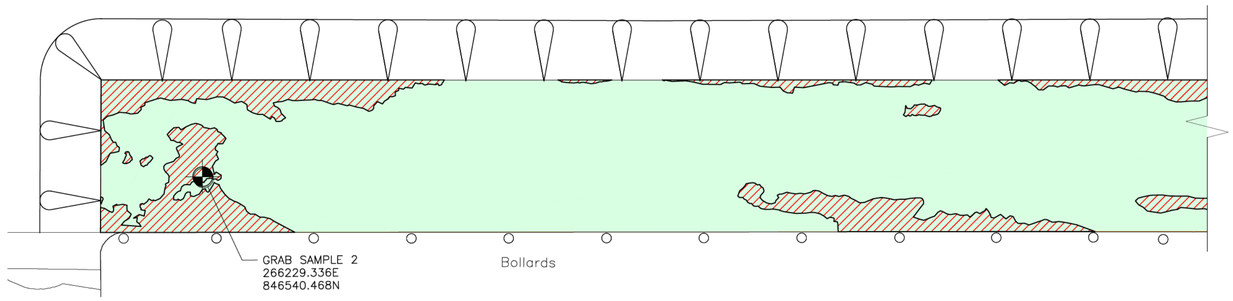
INVERNESS HARBOUR MAINTENANCE DREDGE RIVER NESS CHANNEL DREDGE

DRAWN	CHECKED	APPROVED
JHG	TR	TR
DATE 14.06.21	DATE 02.07.21	DATE 02.07.21

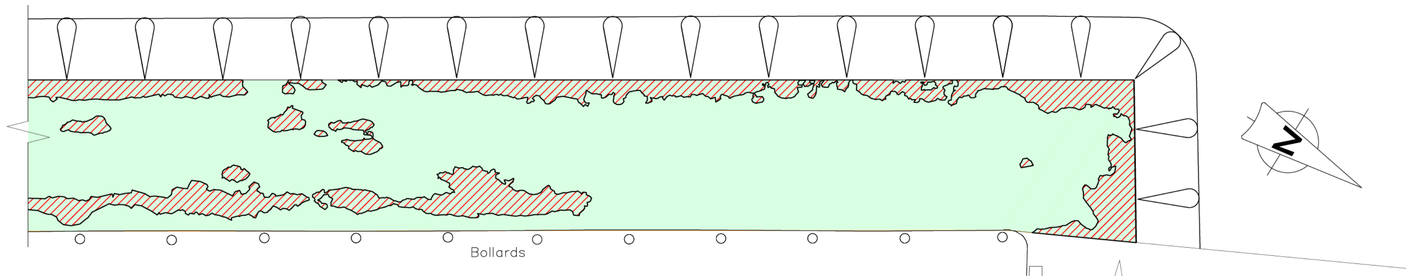
SCALE (A1) 1:1250 STAGE CONSENTS

REVISION A B C

PROJECT No. 2021 DRAWING No. 321

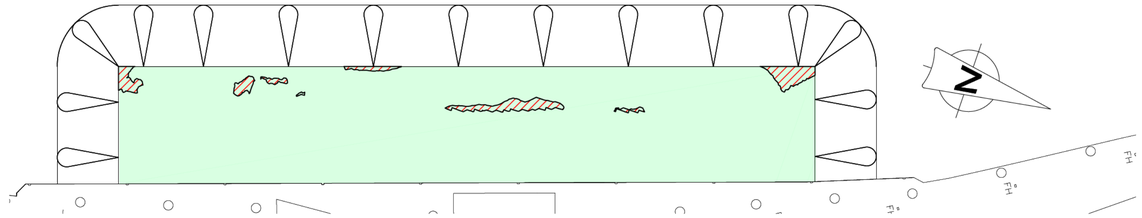


LONGMAN QUAY
SCALE 1:500



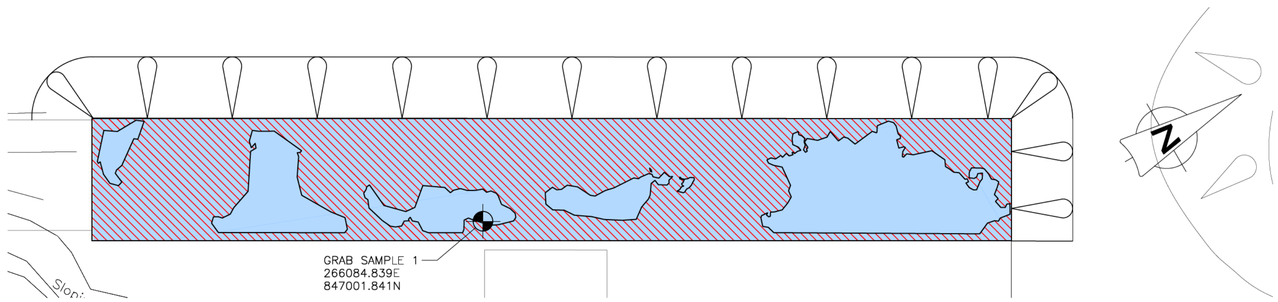
LONGMAN QUAY (CONTINUED)
SCALE 1:500

PROPOSED DREDGE DEPTH < 0.75m
VOLUME OF DREDGE = 221m³
AREA OF DREDGE = 1656m²



SOUTH CITADEL QUAY
SCALE 1:500

PROPOSED DREDGE DEPTH < 0.3m
VOLUME OF DREDGE = 7m³
AREA OF DREDGE = 70m²



NORTH LONGMAN QUAY
SCALE 1:500

PROPOSED DREDGE DEPTH < 0.75m
VOLUME OF DREDGE = 488m³
AREA OF DREDGE = 2090m²

0 10 20 30 40 50
SCALE 1:500 METRES

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES RELATIVE TO CHART DATUM UNLESS NOTED OTHERWISE.
3. CHART DATUM IS 2.25m BELOW ORDNANCE DATUM.
4. TIDE LEVELS:

HAT 5.3m	MLWN 1.7m
MHWS 4.6m	MLWS 0.8m
MHWN 3.5m	LAT −0.1m

5. FOR DREDGE POCKET LOCATIONS REFER TO DRAWING 2021−321

LEGEND

- DEPOSITS ABOVE −5.5m CD
- DREDGE POCKET −5.5m CD OR BELOW
- DEPOSITS ABOVE −5.0m CD
- DREDGE POCKET −5.0m CD OR BELOW

REV	DATE	DETAILS	DRAWN	CHK'D	APP'D
B	07.01.21	DREDGE AREA ADDED	PM	TR	TR
A	06.10.21	COORDINATES OF 'AS DUG' GRAB SAMPLES ADDED	ADS	TR	TR

AMENDMENTS

CLIENT
PORT OF INVERNESS

PROJECT
HARBOUR ENGINEER

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REVISION A B

PROJECT No. 2021 DRAWING No. 322